

## ABSTRACT

The present invention is a digital dynamic compression or automatic gain control (AGC) (10) adapted for use in high quality audio and hearing aids applications. An efficient digital AGC design employs two compact ROM-based tables (ROM\_CSD, ROM\_SPL) in addition to two comparators (COMP\_A, COMP\_B) and several registers (REG\_A, REG\_B, ADDR\_A, ADDR\_B). While one ROM stores the values of discrete input signal levels, the other contains gain codes based on a canonical signed digit (CSD) coding approach that leads to a very simple gain multiplier (20). In many cases an extremely compact table for gain values can be achieved by reusing a single small-size ROM that behaves like one that is several time larger. Two design examples are shown to expound the insights of the new digital AGC design. For the less-than-half-dB-gain-step cases only two adders are required for the multiplier whereas just three adders are needed in the situations with less than quarter-dB gain steps.